

**DECISION RECORD**  
**JIREH Exploration & Consulting, LLC.**  
**E. Box Elder Draw Federal 1-33, WY-070-EA11-234**  
**Buffalo Field Office, Bureau of Land Management**

**DECISION:**

The BLM approves JIREH Exploration & Consulting, LLC's, E. Box Elder Draw Federal 1-33 oil well application for permit to drill (APD) as described in Alternative B of the environmental assessment (EA) WY-070-EA11-234. This approval includes the well's associated access road.

**Compliance:** This decision complies with:

- Federal Land Policy and Management Act of 1976 (FLPMA) (43 USC 1701).
- Mineral Leasing Act of 1920 (MLA) (30 U.S.C. 181); to include On Shore Order No. 1.
- National Environmental Policy Act of 1969 (NEPA) (42 USC 4321).
- Buffalo Resource Management Plan (RMP) 1985, Amendments 2001, 2003.
- DOI Order 3310

Details of the approval of Alternative B are summarized below. The project description, including specific changes made at the onsites, and site-specific mitigation measures, is included in the EA.

**Well Site:**

BLM approves the following APD(s) and associated infrastructure:

	<b>Well Name</b>	<b>Well #</b>	<b>Qtr/Qtr</b>	<b>Section</b>	<b>TWP</b>	<b>RNG</b>	<b>Lease #</b>
1	E. Box Elder Draw Federal	1-33	NWSW	33	52	69	WYW173773

**Limitations:** There are no denials or deferrals. Also see the COAs.

**THE FINDING OF NO SIGNIFICANT IMPACT (FONSI).** Analysis of Alternative B in the EA, WY-070-EA11-234, and the FONSI found JIREH Exploration & Consulting, LLC's proposal for E. Box Elder Draw Federal 1-33 will have no significant impacts on the human environment, beyond those described in the PRB FEIS, thus an EIS is not required.

**DECISION RATIONALE:**

The decision to authorize the selected project, as summarized above, is based on the following:

1. Mitigation measures were included to reduce environmental impacts while meeting the project's purpose and need. For a complete description of all site-specific COA's associated with this approval, see Appendix A COAs, in the EA.
2. The selected alternative will not result in any undue or unnecessary environmental degradation.
3. The selected alternative will help meet the nation's energy needs, and help stimulate local economies by maintaining workforce stability.
4. The Operator committed to:
  - Comply with all applicable federal, state, and local laws and regulations.
  - The operator incorporated several measures to alleviate resource impacts into their surface use plan and drilling plan submitted.
5. The Operator certified it has a surface use agreement with the Landowners..

6. The project is clearly lacking in wilderness characteristics for the following reasons. The project is less than 5,000 acres, has no outstanding opportunities for solitude, is in the middle of oil and gas development and there is no federally owned surface.

**ADMINISTRATIVE REVIEW AND APPEAL:** This decision is subject to administrative review according to 43 CFR 3165. Request for administrative review of this decision must include information required under 43 CFR 3165.3(b) (State Director Review), including all supporting documentation. Such a request must be filed in writing with the State Director, Bureau of Land Management, P.O. Box 1828, Cheyenne, Wyoming 82003, no later than 20 business days after this Decision Record is received or considered to have been received. Any party who is adversely affected by the State Director's decision may appeal that decision to the Interior Board of Land Appeals, as provided in 43 CFR 3165.4.

Field Manager: Shane G. Ape

Date: 7/29/11


**FINDING OF NO SIGNIFICANT IMPACT**  
**JIREH Exploration & Consulting, LLC.**  
**E. Box Elder Draw Fed 1-33, WY-070-EA11-234**  
**Buffalo Field Office, Bureau of Land Management**

**FINDING OF NO SIGNIFICANT IMPACT (FONSI):** Based on the information in the environmental assessment (EA) WY-070-EA11-234, which is incorporated here by reference; it is my finding that: (1) the implementation of Alternative B will not have significant environmental impacts beyond those already addressed in the Buffalo Final Environmental Impact Statement (FEIS) 1985, and the Powder River Basin (PRB) FEIS, 2003, to which the EA is tiered; (2) Alternative B conforms to the Buffalo Field Office (BFO) Resource Management Plan (RMP) (1985, 2001, 2003); and (3) Alternative B does not constitute a major federal action having a significant effect on the human environment. Thus an EIS is not required. I base this finding on my consideration of the Council on Environmental Quality's (CEQ) criteria for significance (40 CFR 1508.27), both with regard to the context and to the intensity of the impacts described in the EA, and in consideration of Interior Department Order 3310.

**CONTEXT:** Mineral development is a long-standing and common land use in the PRB. About 40% of the nation's coal comes from the PRB. The PRB FEIS reasonably foreseeable development predicted and analyzed the development of 51,000 CBNG wells and 3,200 oil wells. The additional oil development described in Alternative B is insignificant within the national, regional, and local context.

**INTENSITY:** The implementation of Alternative B will result in beneficial effects in the forms of energy and revenue production; however, there will also be adverse effects to the environment. Design features and mitigation measures included in Alternative B will minimize adverse environmental effects. The preferred alternative does not pose a significant risk to public health and safety. The geographic area of project does not contain unique characteristics identified within the 1985 RMP, 2003 PRB FEIS, or other legislative or regulatory processes.

Relevant scientific literature and professional expertise were used in preparing the EA. The scientific community is reasonably consistent with their conclusions on environmental effects relative to oil and gas development. Research findings on the nature of the environmental effects are not highly controversial, highly uncertain, or involve unique or unknown risks. The PRB FEIS predicted and analyzed oil development of the nature proposed with this project and similar projects. The selected alternative does not establish a precedent for future actions with significant effects.

There are no cultural or historical resources present that will be adversely affected by the selected alternative. The project is clearly lacking in wilderness characteristics for the following reasons. The project is less than 5,000 acres, has no outstanding opportunities for solitude, is in the middle of oil and gas development and there is no federally owned surface. No species listed under the Endangered Species Act or their designated critical habitat will be adversely affected. The selected alternative will not have any anticipated effects that would threaten a violation of federal, state, or local law or requirements imposed for the protection of the environment.

**ADMINISTRATIVE REVIEW AND APPEAL:** This finding is subject to administrative review according to 43 CFR 3165. Request for administrative review of this finding must include information required under 43 CFR 3165.3(b) (State Director Review), including all supporting documentation. Such

a request must be filed in writing with the State Director, Bureau of Land Management, P.O. Box 1828, Cheyenne, Wyoming 82003, no later than 20 business days after this FONSI is received or considered to have been received. Any party who is adversely affected by the State Director's decision may appeal that decision to the Interior Board of Land Appeals, as provided in 43 CFR 3165.4.

Field Manager: J. Anne to Apr

Date: 7/29/11

**ENVIRONMENTAL ASSESSMENT**  
**JIREH Exploration & Consulting, LLC.**  
**E. Box Elder Draw Federal 1-33, WY-070-EA11-234**  
**Buffalo Field Office, Bureau of Land Management**

## **1. INTRODUCTION**

This site-specific analysis tiers into and incorporates by reference the information and analysis contained in the Final Environmental Impact Statement and Proposed Plan Amendment for the Powder River Basin Oil and Gas Project (PRB FEIS), #WY-070-02-065, 2003, and the PRB FEIS Record of Decision (ROD) pursuant to 40 CFR 1508.28 and 1502.21. This document may be reviewed at the BLM Buffalo Field Office (BFO) and on BFO's website.

### **1.1. Background**

JIREH Exploration & Consulting, LLC. submitted the E. Box Elder Draw Federal 1-33 on January 4, 2010 to the BFO with 1 federal application for permit to drill (APDs) to develop and produce oil in the PRB.

A field onsite with JIREH Exploration & Consulting, LLC. for the E. Box Elder Draw Federal 1-33 was held on 8/19/10. The post onsite deficiency letter was sent on 9/10/2010.

Deficiencies were received on 4/15/11.

### **1.2. Purpose and Need for the Proposed Project**

The need for this project is to determine how and under what conditions to balance natural resource conservation with allowing the operator to exercise lease rights to develop fluid minerals on federal leaseholds as described in their proposed project. Information contained in the application for permit to drill (APD) is an integral part of this EA and is incorporated by reference (CFR 1502.21). The extraction of fluid minerals is important to meeting the nation's energy needs. The fluid mineral leasing programs fall under the authority of the Mineral Leasing Act of 1920 and the Federal Land Policy Management Act (FLPMA), and other laws and regulations.

### **1.3. Decision to be Made**

The BLM will decide whether or not to approve the proposed development, and if so, under what terms and conditions to comport with the Bureau's multiple use mandate, environmental protection, and RMP.

### **1.4. Scoping and Issues**

The BFO limited external scoping on this EA to its timely publication on the BFO website. Previously BFO conducted extensive external scoping for the PRB FEIS - discussed on p. 2-1 of the PRB FEIS and on p. 15 of the PRB ROD. This project is similar in scope to other fluid mineral development analyzed by the BFO. External scoping would be unlikely to identify new issues, as verified by the few fluid mineral EAs that were recently externally scoped such as the Clabaugh (WY-070-EA08-134) and Hollcroft/Stotts Draw (WY-070-EA07-021). Recent external scoping in 2010 and 2011 for a geographically-focused proposed RMP amendment revealed no new issues outside of the geographically-specific issues.

The BFO interdisciplinary team (ID team) conducted internal scoping by reviewing the proposed development and project location to identify potentially affected resource and land uses. The ID team identified resources and land uses present and affected by the proposed project. This EA will not discuss resources and land uses that are either not present, not affected, or that the PRB FEIS adequately addressed. The ID team identified important issues for the affected resources to focus the analysis. This

EA addresses the project and its site-specific impacts that were unknown and unavailable for review at the time of the PRB FEIS analysis to help the decision maker come to a reasoned decision. Project issues include:

- Soils and vegetation: site stability, reclamation potential, riparian and wetland communities, invasive species
- Wildlife: raptor productivity, greater sage-grouse lek occupancy and persistency
- Cultural Resources

These issues are not present, or minimally so, or were analyzed in the EIS and therefore are not analyzed in this EA:

- Air quality
- Geological resources
- Water resources
- Cave and karst resources
- Mineral resources: locatable, leasable-coal, salable
- Fire, fuels management, and rehabilitation
- Vegetation
- Invasive species
- Special status species
- Paleontology
- Visual resources
- Forest, lands, realty
- Renewable energy
- Rights-of-way
- Transportation
- Wilderness characteristics
- Livestock grazing
- Areas of critical environmental concern (ACEC)
- Wild and scenic rivers
- Wilderness study areas
- Social and economic resources
- Environmental justice
- Tribal Treaty rights

## **2. PROPOSED PROJECT AND ALTERNATIVES**

### **2.1. Alternative A - No Action**

The PRB FEIS considered a No Action Alternative, Volume 1, pp. 2-54 to 2-62. This alternative consists of no new federal well(s) as proposed. An oil and gas lease grants the lessee the conditional right and privilege to drill for, extract, remove, and dispose of oil and gas deposits in the lease lands, subject to the terms and conditions incorporated in the lease, other laws, regulations, and natural resource conservation measures. This alternative would deny the proposal for this well(s) and would require resubmission of the proposal for a proposal that complies with the law and the reasonable measures in the Buffalo Resource Management Plan (RMP), 1985, 2001, and 2003. In rare cases the Secretary, or her/his agent, may administratively cancel the lease if wrongfully awarded, or may negotiate to repurchase the lease which may lead to a just compensation claim.

### **2.2. Alternative B Proposed Action**

**Project Name:** E. Box Elder Draw Federal 1-33

**Well Name/#/Lease/Location/County:** E. Box Elder Draw Federal 1-33 WYW173773 NWSW, Sec. 33 T52N, R69W

**Operator/Applicant:** JIREH Exploration & Consulting LLC

**Surface Owners:** Clark Reynolds

The proposed project is to drill and develop an oil well. The project would be subject to the conditions-of-approval (COAs) for drilling of an oil well in the BFO jurisdiction. For a detailed description of design features and construction practices associated with the proposed project, refer to the surface use plan (SUP) and drilling plan included with the APD. Also see the subject APD for maps showing the proposed well location and associated facilities described above.

Implementation of committed mitigation measures contained in the SUP and drilling plan, in addition to the COAs in the PRB FEIS Record of Decision, are incorporated and analyzed in this alternative.

Additionally, the Operator, in their APD, committed to:

1. Comply with all applicable federal, state and local laws and regulations.
2. Obtain the necessary permits from other agencies for the drilling, completion and production of these wells including water rights appropriations, and relevant air quality permits.
3. The Operator certified he has a surface use agreement with the landowners.

The Operator certified that a copy of the SUP was provided to the relevant landowner(s).

### **2.3. Alternatives Considered but Eliminated from Detailed Analysis**

An alternate access was discussed at the onsite. The access was from the west off of Adon County Road through Clark Reynolds Ranch. This access was not analyzed due to over 1 mile of new road construction through numerous drainages including Cottonwood Creek and the unknown future of the well. If the well is a producer the alternate access may be reconsidered, and submitted by sundry.

### **2.4. Conformance with the Land Use Plan and Other Environmental Assessments**

This proposal does not diverge from the goals and objectives in the Buffalo Resource Management Plan (RMP), 1985, 2001, 2003, and generally conforms to the terms and conditions of that land use plan, its amendments, and supporting FEISs, 1985, 2003.

### 3. AFFECTED ENVIRONMENT

This section briefly describes the environment affected by implementation of the alternatives in Section 2. Aspects of the affected environment here focus on the major issues. Find a screening of all resources and land uses potentially affected in Appendix A. Resources unaffected, or not affected beyond the level analyzed in the PRB FEIS, are outside the scope of this EA.

#### **Project Area Description**

The project area is situated in the Powder River Basin of Wyoming and more specifically in an upland area which is northeast of Cottonwood Creek, east of Zoe Draw. Elevations are about 4,000 feet above sea level. Topography ranges from gentle sloping uplands with flat benches to rugged with steep ridgelines and deeply incised draws. The project area is drained by Cottonwood Creek and Timber Draw tributaries of the Little Powder River located NW of the project area.. This area is managed as rangeland with livestock grazing and existing conventional oil and gas development as the main uses.

#### **3.1. Vegetation & Soils**

Species typical of short grass prairie comprise the general project area flora. Specific species observed during the onsite throughout the project area include: little bluestem, bluebunch wheat grass, prairie june grass, needle- and-thread grass, thread leaf sedge and Wyoming big sagebrush. Differences in dominant species within the project area vary with land use, soil type, aspect and topography.

The soils vary from primarily loamy to sands throughout the project area. Soils differ with topographic location, slope and elevation. Topsoil depths to be salvaged for reclamation range from 4 to 6 inches. Erosion potential varies from low to moderate depending on the soil type, vegetative cover and slope. Reclamation potential of soils also varies throughout the project area. The ecological site for this project is Loamy. A sandstone outcrop is located on the NE corner of the proposed pad. Successful reclamation is expected with sound land management principles, adequate moisture and time.

This site occurs on gently undulating rolling land presently used for livestock grazing. Landform: Hill sides, alluvial fans, ridges & stream terraces. The soils of this site are deep to moderately deep (greater than 20" to bedrock), well drained & moderately permeable. Layers of the soil most influential to the plant community varies from 3 to 6 inches thick. These layers consist of the A horizon with very fine sandy loam, loam, or silt loam texture and may also include the upper few inches of the B horizon with sandy clay loam, silty clay loam or clay loam texture. The main soil limitations include: low organic matter content and soil droughtiness. The low annual precipitation should be considered when planning a seeding. For more detailed soil information, see the NRCS Soil Survey WY 619.

Dominate plant community for this project is Rhizomatous Wheatgrasses, Needle-and-thread, Blue Grama Plant Community. This plant community is the interpretive plant community for this site and is considered to be the Historic Climax Plant Community (HCPC). This plant community evolved with grazing by large herbivores and is well suited for grazing by domestic livestock. This plant community can be found on areas that are properly managed with grazing and/or prescribed burning, and sometimes on areas receiving occasional short periods of rest. The potential vegetation is about 75% grasses or grass-like plants, 15% forbs, and 10% woody plants. This state is dominated by cool season mid-grasses.

The major grasses include western wheatgrass, needleandthread, and green needlegrass. Other grasses occurring in this state include Cusick's and Sandberg's bluegrass, bluebunch wheatgrass, and blue grama. A variety of forbs and half-shrubs also occur. Big sagebrush is a conspicuous element of this state, occurs in a mosaic pattern, and makes up 5 to 10% of the annual production. Plant diversity is high.

This plant community is extremely stable and well adapted to the Northern Great Plains climatic

conditions. The diversity in plant species allows for high drought tolerance. This is a sustainable plant community (site/soil stability, watershed function, and biologic integrity).

### **3.2. Wetlands/Riparian**

No wetlands or riparian areas are affected by the project.

### **3.3. Invasive Species**

Leafy spurge is a state-listed noxious weed and was discovered by a search of inventory maps and/or databases.

Cheatgrass or downy brome (*Bromus tectorum*) and to a lesser extent, Japanese brome (*B. japonicus*) are known to exist in the affected environment. These two species are found in high densities and numerous locations throughout NE Wyoming. Cheatgrass was seen during the field visit on the proposed well location.

### **3.4. Wildlife (Fish and Wildlife)**

The PRB FEIS identified wildlife species occurring in the PRB, pp. 3-113 to 3-206. A BLM wildlife biologist performed a habitat assessment in the project area on 8/19/2010. The biologist evaluated impacts to wildlife resources and recommended project modifications where wildlife issues arose. The BLM wildlife biologist also consulted databases compiled and managed by BLM BFO wildlife staff, the PRB FEIS, Wyoming Game and Fish Department (WGFD) datasets, and the Wyoming Natural Diversity Database (WYNDD) to evaluate the affected environment for wildlife species that may occur in the project area. The BLM wildlife biologist contacted the regional wildlife biologist for the WGFD to gather site-specific habitat information, and to solicit comments on the proposed action. No independent wildlife report was submitted by the proponent. This section describes the affected environment and impacts to wildlife known or likely to occur in the area of the proposed project.

#### **3.4.1. Big Game**

The big game species expected to occur in the project area are mule deer, whitetail deer, and antelope according to the WGFD. The PRB FEIS discussed the affected environment for the above species on pp. 3-113 to 3-206.

#### **3.4.2. Migratory Birds**

Migratory birds are those that migrate for the purpose of breeding and foraging at some point in the year. BLM must include migratory birds in every NEPA analysis of actions that have the potential to affect migratory bird species of concern in order to fulfill its obligations under the Migratory Bird Treaty Act. The WGFD Wyoming Bird Conservation Plan (Nicholoff 2003) identified three groups of high-priority bird species in Wyoming: Level I – those that clearly need conservation action, Level II – species where the focus should be on monitoring, rather than active conservation, and Level III – species that are not otherwise of high priority but are of local interest.

Shrub-steppe vegetation dominates the project area, with the exception of a stand of conifers occupying a draw in T52N, R69W, Sec. 33, 0.43 miles north of the proposed well and access. The trees occupy approximately 730 feet of the draw, running from east to west. Many species that are of high management concern use shrub-steppe areas for their primary breeding habitats (Saab and Rich 1997). Nationally, grassland and shrubland birds declined more consistently in the last 30 years than any other ecological association of birds (WGFD 2009). Species that may occur in these vegetation types in northeast Wyoming, according to the Wyoming Bird Conservation Plan, appear Table 3.2., grouped by level as identified in the plan.

**Table 3.2. Migratory bird species occurring in shrub-steppe habitat, NE Wyoming (Nicholoff 2003)**

Level	Species	Wyoming BLM Sensitive
Level I	Brewer’s sparrow	Yes
	Ferruginous hawk	Yes
	Greater sage-grouse	Yes
	McCown’s longspur	No
	Sage sparrow	Yes
Level II	Lark bunting	No
	Lark sparrow	No
	Loggerhead shrike	Yes
	Sage thrasher	Yes
	Vesper sparrow	No
Level III	Common poorwill	No
	Say’s phoebe	No

The PRB FEIS addressed the affected environment for migratory birds, pp. 3-150 to 3-153. The discussion included habitat requirements and foraging patterns for the species listed above, with the exception of common poorwills and Say’s phoebes, addressed below.

Common poorwills inhabit sparse, rocky sagebrush; open prairies; mountain-foothills shrublands; juniper woodlands; brushy, rocky canyons; and ponderosa pine woods. They prefer clearings, like grassy meadows, riparian zones, and forest edges for foraging. They lay eggs directly on gravelly ground, flat rock, or litter of woodland floor. Nests are often near logs, rocks, shrubs, or grass for some shade. They feed exclusively on insects. Say’s phoebes inhabit arid, open country with sparse vegetation, including shrub-steppe, grasslands, shrublands, and juniper woodlands. They nest on cliff ledges, banks, bridges, eaves, and road culverts and often reuse nests in successive years. They eat mostly insects and berries.

### **3.4.3. Raptors**

The PRB FEIS discussed the affected environment for raptors, pp. 3-141 to 3-148. According to the BLM raptor database, there are no documented raptor nests within 0.5 miles of the proposed well or access. However, the BLM wildlife biologist noted potential nesting substrate in the previously described draw 0.43 miles north of the proposed well and access. Though no nests were identified, cavities exist in the snags and live trees in the draw that may provide nesting habitat for a variety of raptor species.

### **3.5. Threatened, Endangered, and Special Status Species (SSS) – Plants, Fish, and Wildlife**

Potential for occurrence and determination of effects for Threatened, Endangered or Candidate species are contained in Section 4.3, Table 4.3.

Wyoming BLM annually updates its list of SSS to focus management to maintain habitats to preclude listing as a threatened or endangered species. The policy goals are:

- Maintaining vulnerable species and habitat components in functional BLM ecosystems
- Ensuring sensitive species are considered in land management decisions
- Preventing a need for species listing under the Endangered Species Act (ESA)
- Prioritizing needed conservation work with an emphasis on habitat

Table 4.3.1 lists those SSS that may occur in the project area. The Table also includes a brief description of the habitat requirements for each species. The authority for the SSS comes from the ESA, as amended; Title II of the Sikes Act, as amended; the FLPMA; Department Manual 235.1.1A and BLM Manual 6840.

#### **3.5.1. Greater Sage-Grouse**

The U.S Fish and Wildlife Service (FWS) determined that the greater sage-grouse (sage-grouse) warrants

federal listing as threatened or endangered across its range, but precluded listing due to other higher priority listing actions, 75 Fed. Reg. 13910 to 14014, Mar. 23, 2010; 75 Fed. Reg. 69222 to 69294, Nov. 10, 2010. Sage-grouse are a WY BLM SSS and a WGFD species of greatest conservation need, because populations are declining and they are experiencing ongoing habitat loss. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. Sage-grouse are also a BCC for FWS's Region 17. The PRB FEIS addressed the affected environment for sage-grouse, pp. 3-194 to 3-199.

The State Wildlife Agencies' Ad Hoc Committee for Consideration of Oil and Gas Development Effects to Nesting Habitat (2008) recommends that impacts to leks occur within 4 miles of oil and gas developments. WGFD records indicate that 2 sage-grouse leks occur within 4 miles of the project area. The Boxelder Draw lek was surveyed by WGFD in 2007 with 13 males observed, and in 2009 with 12 males observed. The East Adon lek was surveyed in 2007 and 2010 with no males observed; 2004 was the last year of surveys where males were observed attending the East Adon lek.

A portion of the access is proposed on an existing ranch road, within ¼ mile of the Boxelder Draw lek. According to the surface owner and WGFD personnel, this road is used at least twice a day from September to June by the residents of the property, and sees some maintenance traffic associated with ranching operations and other oil well development. Alternate access routes outside the ¼ mile spatial would be placed in undisturbed sagebrush and grassland. The alignment of the existing road is the access preferred by the surface owner.

Suitable sage-grouse habitat (as defined in Soehn, et al., 2001 ) is present along the proposed 1600 feet of new access road and the well location. The biologist confirmed the habitat models, which indicated that high-quality nesting and winter habitat is present in the areas surrounding this location

### **3.6. Cultural Resources**

Class III cultural resource inventory was performed for the Box Elder 1-33 well and access prior to on-the-ground project work (BFO project no. 70100012). A class III cultural resource inventory following the Archeology and Historic Preservation, Secretary of the Interior's Standards and Guidelines (48CFR190) and the *Wyoming State Historic Preservation Office Format, Guidelines, and Standards for Class II and III Reports* was provided to BFO by JIREH. Seth Lambert, BLM Archaeologist, reviewed the report for technical adequacy and compliance with Bureau of Land Management (BLM) standards, and determined it to be adequate.

### **3.7. Air Quality**

Existing air quality in most of the PRB is in attainment with all ambient air quality standards. However specific air quality presents a knowledge gap as monitoring does not occur throughout most of the PRB. PRB air quality is a rising concern due to ozone concentrations in the oil and gas producing Upper Green River Basin that exceeded EPA limits for 13 days in 2011.

Existing air pollutant emission sources in the region include:

- Exhaust emissions (primarily carbon monoxide [CO] and nitrogen oxides [NOx]) from existing natural gas fired compressor engines used in production of natural gas and CBNG; and, gasoline and diesel vehicle tailpipe emissions of combustion pollutants;
- Dust (particulate matter) generated by vehicle travel on unpaved roads, windblown dust from neighboring areas and road sanding during the winter months;
- Transport of air pollutants from emission sources located outside the region;
- Dust (particulate matter) from coal mines;
- NOx, particulate matter, and other emissions from diesel trains and,

- SO<sub>2</sub> and NO<sub>x</sub> from power plants.

Refer to the PRB Final EIS Vol. 1, Chap. 3, pp. 3-291 to 3-299, for a complete description of the existing air quality conditions in the PRB.

### 3.8. Wilderness Characteristics

The proposed project area under any alternative is less than 5,000 acres of federal surface.

## 4. ENVIRONMENTAL EFFECTS

The changes to the proposed project resulted in development of Alternative B as the preferred alternative. The changes reduced impacts to the environment which will result from this project therefore only the environmental consequences of Alternative B are described below.

### 4.1. Vegetation & Soils

Surface disturbance of road and well pad will remove vegetation and displace soil long term. Once all constructions is complete, areas not needed for production will be reclaimed in the interim. After the life of the well, all disturbed areas will be reclaimed to an appropriate ecological site/state.

The ecological site for this project is Loamy. Table 4.1 summarizes the proposed surface disturbance.

**Table 4.1 - SUMMARY OF DISTURBANCE**

Facility	No. or Mileage	Factor	Disturbance (acres)	Duration
Well Pad(s)	70,000 sq. ft.	W*L/43560 acre	1.6 A.	Long Term
Improved Roads	0.31 mi.	50' Corridor	1.84 A.	Long Term
Spot Upgrade on Existing Roads	1.2 mi.	N/A	N/A	Long Term
Flowlines	None anticipated			

The designation of the duration of disturbance is defined in the PRB FEIS (pp. 4-1 and 4-151). “For this EIS, short-term effects are defined as occurring during the construction and drilling/completion phases. Long-term effects are caused by construction and operations that would remain longer”.

The cumulative impacts of the proposed action, when considered with other existing and proposed development in the project area, are not expected to be significant. The application of mitigation measures will ensure that the incremental impacts of this well, when considered with any existing development, are insignificant. For more information on cumulative impacts, please refer to the PRB FEIS. The impacts listed below would increase the potential for soil loss due to increased water and wind erosion, invasive plant establishment, and increased sedimentation and salt loads to the watershed system. The effects to soils resulting from well pad and access road construction include:

- Mixing of horizons – occurs where construction on roads, pipelines or other activities take place. Mixing may result in removal or relocation of organic matter and nutrients to depths where it would be unavailable for vegetative use. Soils which are more susceptible to wind and water erosion may be moved to the surface. Soil structure may be destroyed, which may impact infiltration rates. Less desirable inorganic compounds such as carbonates, salts or weathered materials may be relocated and have a negative impact on revegetation. This drastically disturbed site may change the ecological integrity of the site and the recommended seed mix.

- Soil compaction – the collapse of soil pores results in decreased infiltration and increased erosion potential. Factors affecting compaction include soil texture, moisture, organic matter, clay content and type, pressure exerted, and the number of passes by vehicle traffic or machinery.
- Alteration of surface runoff characteristics.
- An important component of soils in Wyoming’s semiarid rangelands, especially in the Wyoming big sagebrush cover type, are biological soil crusts, or cryptogamic soils that occupy ground area not covered with vascular plants. Biological soil crusts are important in maintaining soil stability, controlling erosion, fixing nitrogen, providing nutrients to vascular plants, increasing precipitation infiltration rates, and providing suitable seed beds (BLM 2003). They are adapted to growing in severe climates; however, they take many years to develop (20 to 100) and can be easily disturbed or destroyed by surface disturbances associated with construction activities.

Direct effects (removal and/or compaction) to vegetation would occur from ground disturbance caused by drilling rig equipment and construction of a well pads, tank batteries, associated pipelines and roads. Short term effects would occur where vegetated areas are disturbed but later reclaimed within 1 to 3 years of the initial disturbance. Long-term effects would occur where well pads, compressor stations, roads, water-handling facilities or other semi-permanent facilities may result in loss of vegetation and affect reclamation success for the life of the project.

#### **4.1.1. Wetland/Riparian**

No wetlands or riparian areas are affected by the project.

#### **4.1.2. Invasive Species**

Cheatgrass or downy brome (*Bromus tectorum*) and to a lesser extent, Japanese brome (*B. japonicus*) are known to exist in the affected environment. These two species are found in such high densities and numerous locations throughout NE Wyoming that a control program is not considered feasible at this time.

The use of existing facilities along with the surface disturbance associated with construction of proposed access roads, pipelines, and related facilities would present opportunities for weed invasion and spread. The activities related to the performance of the proposed project would create a favorable environment for the establishment and spread of noxious weeds/invasive plants such as Canada thistle and perennial pepperweed. However, mitigation as required by BLM applied COAs will reduce potential impacts from noxious weeds and invasive plants.

### **4.2. Wildlife (Fish and Wildlife) (Alternative B – Environmentally Preferred)**

#### **4.2.1. Big Game**

Impacts to big game are discussed in the PRB FEIS on pp. 4-181 to 4-215. As discussed in that document, impacts to mule deer may occur through alterations in hunting and/or poaching, increased vehicle collisions, harassment and displacement, increased noise, increased dust, alterations in nutritional status and reproductive success, increased fragmentation, loss or degradation of habitats, reduction in habitat effectiveness, and declines in populations.

#### **4.2.2. Migratory Birds**

Direct and indirect effects to migratory birds are discussed in the PRB FEIS (pp. 4-231 to 4-235). More recent research suggests that impacts will occur. Ingelfinger (2004) identified that the density of some breeding bird species declined within 100 meters of dirt roads within a natural gas field. In the study, the density of Brewer’s sparrows declined by 36%, and the density of breeding sage sparrows

declined by 57%. Effects occurred along roads with light traffic volume (<12 vehicles per day). The increasing density of roads constructed in developing natural gas fields exacerbated the problem creating substantial areas of impact where indirect habitat losses through displacement were much greater than the direct physical habitat losses.

Migratory bird species within the Powder River Basin nest in the spring and early summer and are vulnerable to the same effects as sage-grouse and raptor species. Though no timing restrictions are typically applied specifically to protect migratory bird breeding or nesting, where sage-grouse or raptor nesting timing limitations are applied, nesting migratory birds are also protected. Where these timing limitations are not applied and migratory bird species are nesting, migratory birds remain vulnerable.

The cumulative effects associated with Alternative B are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, p. 4-235. No additional mitigation measures are required.

#### **4.2.3. Raptors**

Direct and indirect effects to raptors are discussed in the PRB FEIS (pp. 4-216 to 4-221). Human activities in close proximity to active raptor nests may interfere with nest productivity. Romin and Muck (1999) indicate that activities within 0.5 miles of a nest are prone to cause adverse impacts to nesting raptors. If mineral activities occur during nesting, they could be sufficient to cause adult birds to remain away from the nest and their chicks for the duration of the activities. This absence can lead to overheating or chilling of eggs or chicks. Prolonged disturbance can also lead to the abandonment of the nest by the adults. Both actions can result in egg or chick mortality. In addition, routine human activities near these nests can draw increased predator activity to the area and increase nest predation.

To reduce the risk of decreased productivity or nest failure, the BLM BFO requires a 0.5 mile radius timing limitation during the breeding season around active raptor nests and recommends all infrastructure requiring human visitation be located in such a way as to provide an adequate biologic buffer for nesting raptors. A biologic buffer is a combination of distance and visual screening that provides nesting raptors with security such that they will not be flushed by routine activities.

Wildlife surveys were not submitted by the project proponent, and the BLM wildlife biologist assessed the area outside of the survey periods prescribed by BLM protocol. Potential raptor nesting habitat was observed within 0.5 miles of the proposed well and access, especially in the wooded draw approximately 0.43 miles north of the project location. BLM will therefore assume that nests are present, or that raptors may initiate nesting activity. The BLM will impose a seasonal timing limitation on surface-disturbing activities.

The cumulative effects associated with Alternative B are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, p. 4-221.

**4.3. Threatened, Endangered and Special Status Species (SSS)**

**Table 4.3. Summary of Threatened and Endangered Species Habitat and Project Effects**

<b>Common Name (scientific name)</b>	<b>Habitat</b>	<b>Project Effects</b>	<b>Rationale</b>
<i>Endangered</i>			
Black-footed ferret	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NE	No suitable habitat present. 2011 USFWS block-cleared PRB for black-footed ferret.
Blowout penstemon	Sparsely vegetated, shifting sand dunes	NE	No suitable habitat present.
<i>Threatened</i>			
Ute ladies'-tresses orchid	Riparian areas with permanent water	NE	No suitable habitat present.
<i>Candidate</i>			
Greater Sage-grouse	Basin-prairie shrub, mountain-foothill shrub	MIIH	Sagebrush cover will be affected.
<b>Project Effects</b>			
<b>LAA</b> - Likely to adversely affect or habitat.		<b>NLAA</b> - May effect, not likely to adversely affect individuals	
<b>NE</b> - No effect		<b>MIIH</b> - May impact individuals and health	

**Table 4.3.1 Threatened, Endangered, Proposed, and Candidate Species Worksheet**

<b>Common Name (scientific name)</b>	<b>Habitat</b>	<b>Presence</b>	<b>Project Effects</b>	<b>Rationale</b>
<i>Amphibians</i>				
Northern leopard frog ( <i>Rana pipiens</i> )	Beaver ponds and cattail marshes from plains to montane zones.	NP	NI	Habitat not present.
Columbia spotted frog ( <i>Ranus pretiosa</i> )	Ponds, sloughs, small streams, and cattails in foothills and montane zones. Confined to headwaters of the S Tongue R drainage and tributaries.	NP	NI	The project area is outside the species' range, and the species is not expected to occur .
<i>Fish</i>				
Sturgeon chub ( <i>Macrhybopsis gelida</i> )	Swift, rocky riffles throughout the Powder River.	NP	NI	Habitat not present.
Yellowstone cutthroat trout ( <i>Oncoryhynchus clarki bouvieri</i> )	Cold-water rivers, creeks, beaver ponds, and large lakes in the Upper Tongue sub-watershed	NP	NI	The project area is outside the species' range, and the species is not expected to occur .
<i>Birds</i>				
Baird's sparrow ( <i>Ammodramus bairdii</i> )	Shortgrass prairie and basin-prairie shrubland habitats; plowed and stubble fields; grazed pastures; dry lakebeds; and other sparse, bare, dry ground.	S	MIIH	Sagebrush cover will be affected.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Bald eagle ( <i>Haliaeetus leucocephalus</i> )	Mature forest cover often within one mile of large water body with reliable prey source nearby.	NS	NI	Human activities will increase
Brewer's sparrow ( <i>Spizella breweri</i> )	Sagebrush shrubland	S	MIIH	Sagebrush cover will be affected.
Ferruginous hawk ( <i>Buteo regalis</i> )	Basin-prairie shrub, grasslands, rock outcrops	NS	NI	Human activities will increase
Greater sage-grouse ( <i>Centrocercus urophasianus</i> )	Basin-prairie shrub, mountain-foothill shrub	K	MIIH	Sagebrush cover will be affected.
Loggerhead shrike ( <i>Lanius ludovicianus</i> )	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.
Long-billed curlew ( <i>Numenius americanus</i> )	Grasslands, plains, foothills, wet meadows	NP	NI	Suitable habitat not present.
Mountain plover ( <i>Charadrius montanus</i> )	Short-grass prairie with slopes < 5%	NP	NI	Habitat not present.
Northern goshawk ( <i>Accipiter gentilis</i> )	Conifer and deciduous forests	NP	NI	Dense forest habitat not present.
Peregrine falcon ( <i>Falco peregrinus</i> )	Cliffs	NP	NI	No nesting habitat present.
Sage sparrow ( <i>Amphispiza billineata</i> )	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.
Sage thrasher ( <i>Oreoscoptes montanus</i> )	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.
Trumpeter swan ( <i>Cygnus buccinator</i> )	Lakes, ponds, rivers	NP	NI	Habitat not present.
Western Burrowing owl ( <i>Athene cunicularia</i> )	Grasslands, basin-prairie shrub	NP	NI	Habitat not present.
White-faced ibis ( <i>Plegadis chihi</i> )	Marshes, wet meadows	NP	NI	Permanently wet meadows not present.
Yellow-billed cuckoo ( <i>Coccyzus americanus</i> )	Open woodlands, streamside willow and alder groves	NP	NI	Streamside habitats not present.
<b>Mammals</b>				
Black-tailed prairie dog ( <i>Cynomys ludovicianus</i> )	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	NP	NI	No known colonies present.
Fringed myotis ( <i>Myotis thysanodes</i> )	Conifer forests, woodland chaparral, caves and mines	S	MIIH	Construction may impact foraging areas and alter habitat conditions.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Long-eared myotis ( <i>Myotis evotis</i> )	Conifer and deciduous forest, caves and mines	S	MIIH	Construction may impact foraging areas and alter habitat conditions.
Swift fox ( <i>Vulpes velox</i> )	Grasslands	NP	NI	Habitat not present.
Townsend's big- eared bat ( <i>Corynorhinus townsendii</i> )	Caves and mines.	S	MIIH	Construction may impact foraging areas and alter habitat conditions.
<b>Plants</b>				
Porter's sagebrush ( <i>Artemisia porteri</i> )	Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes 5300-6500 ft.	NP	NI	Habitat not present.
William's wafer parsnip ( <i>Cymopterus williamsii</i> )	Open ridgetops and upper slopes with exposed limestone outcrops or rockslides, 6000- 8300 ft.	NP	NI	Project area outside of species' range.
<p><b>Presence</b>  <b>K</b> - Known, documented observation within project area.  <b>S</b> - Habitat suitable and species suspected, to occur within the project area.  <b>NS</b> - Habitat suitable but species is not suspected to occur within the project area.  <b>NP</b> - Habitat not present and species unlikely to occur within the project area.</p> <p><b>Project Effects</b>  <b>NI</b> - No Impact.  <b>MIIH</b> - May Impact Individuals or Habitat, but will not likely contribute to a trend towards Federal listing or a loss of viability to the population or species.  <b>WIPV</b> - Will Impact Individuals or Habitat with a consequence that the action may contribute to a trend towards Federal listing or cause a loss of viability to the population or species.  <b>BI</b> - Beneficial Impact</p>				

#### 4.3.1. Greater Sage-Grouse Direct and Indirect Effects

This project is not located within a Key Habitat Area or within habitat identified Core or Connectivity areas under State of Wyoming EO 2011-5; however, implementation of the project will adversely impact nesting habitat, both through direct loss and avoidance of the area by sage-grouse. Construction of 1,600 feet of new access road and a well location will result in the direct removal of 3.44 acres of nesting and brood-rearing habitat. Based upon an avoidance area of 0.6 miles, the access and location will indirectly affect approximately 233 acres of nesting and brood rearing habitat through avoidance of the area by nesting hens.

To protect nesting and brood rearing sage-grouse, BLM will implement a timing limitation (15 March to 30 June) on all surface-disturbing activities associated with the proposed project.

The proposed access includes an existing, partially improved ranch road that will traverse the ¼ mile spatial buffer of the Boxelder Draw lek, an area subjected to a Controlled Surface Use restriction under the BFO RMP and BLM Wyoming Instruction Memorandum No. WY-2010-012. The following site

specific project components and Conditions of Approval would reduce the potential impacts to sage-grouse utilizing the Boxelder Draw lek location:

1. No surface disturbing activity will take place within ¼ mile of the perimeter of the Boxelder Draw lek.
2. Disruptive activities associated with the E. Boxelder Draw #1-33 Well will be restricted on or within ¼ mile of the perimeter of the Boxelder Draw lek from 6pm to 8am from March 15-May 15.

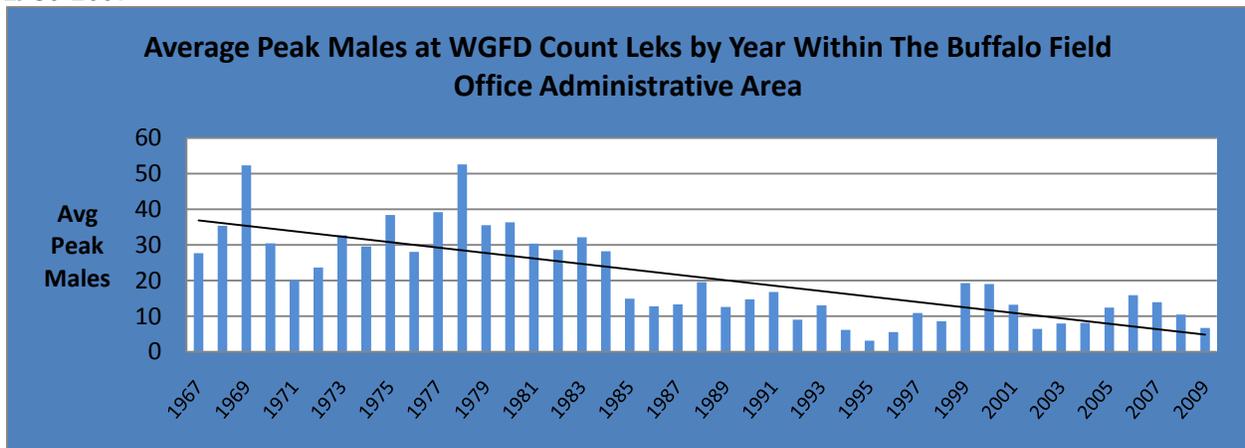
Wyoming Game and Fish Department Biologist, Heather O’Brien, indicated that the disruptive activity timing restriction from March 15-May 15 is sufficient protection for the Boxelder Draw lek.

Direct and indirect impacts to sage-grouse are discussed in more detail in the PRB FEIS on pg. 4-257 to 4-273.

#### 4.3.2. Cumulative Effects

The sage-grouse population within northeast Wyoming has been exhibiting a steady long term downward trend, as measured by lek attendance (WGFD 2009). Figure 3 illustrates a ten-year cycle of periodic highs and lows. Each subsequent population peak is lower than the previous peak. The research described below suggests that these declines may be a result, in part, of CBNG development in this region of Wyoming and that the leks within the cumulative impact assessment area are experiencing similar declines.

**Figure 4. Average number of male sage-grouse per active lek within the WGFD Sheridan region, 1980-2007**



Research has shown that declines in lek attendance are correlated with oil and gas development. In a typical landscape in the Powder River Basin, energy development within two miles of leks is projected to reduce the average probability of lek persistence from 87% to 5% percent (Walker et al. 2007). Several studies have shown that well density can be used as a metric for evaluating impacts to sage-grouse, as measured by declines in lek attendance (Braun et al. 2002, Holloran et al. 2005, and Walker et al. 2007). These studies indicated that oil or gas development exceeding approximately one well pad per square mile, resulted in calculable impacts on breeding populations, as measured by the number of male sage-grouse attending leks (State Wildlife Agencies’ Ad Hoc Committee for Sage-Grouse and Oil and Gas Development 2008).

There are currently 179 wells (Wyoming Oil and Gas Conservation Commission [WOGCC] 07/2011)

within the cumulative impact assessment area, an area of 82.87 square miles, which amounts to a density of approximately 2.208 wells per square mile which is more than twice the one well per square mile recommendation by the State Wildlife Agencies' Ad Hoc Committee for Sage-Grouse and Oil and Gas Development. Currently, there are 4 proposed wells (Automated Fluid Minerals Support System [AFMSS] 07/2011) (including the one from this project) within cumulative impact assessment area. With the addition of the proposed wells, the well density within four miles of the leks increases to 2.220 wells per square mile. The addition of the proposed wells, including the proposed action, does not elevate the level of impacts in the cumulative impact assessment area.

In its *Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats* (2009), WGFD categorized levels of oil and gas development into thresholds that correspond to moderate, high, and extreme impacts to habitat effectiveness for various species of wildlife, based on well pad densities and acreages of disturbance. All three levels of impact result in a loss of habitat function by directly eliminating habitat; disrupting wildlife access to, or use of habitat; or causing avoidance and stress to wildlife. Impacts to sage-grouse are categorized by number of well pad locations per square mile within two miles of a lek and within identified nesting/brood-rearing habitats greater than two miles from a lek. Moderate impacts occur when well density is between one and two well pad locations per square mile or where there is less than 20 acres of disturbance per square mile. High impacts occur when well density is between two and three well pad locations per square mile or when there are between 20 and 60 acres of disturbance per square mile. Extreme impacts occur when well density exceeds three well pad locations per square mile or when there are greater than 60 acres of disturbance per square mile. Extreme impacts mean those where the function of an important wildlife habitat is substantially impaired or lost

The proposed project is within two miles of one sage-grouse lek. This lek has fewer than one well per square mile within two miles, which represents a low impact according to the WGFD recommendations. Implementation of the proposed project will not elevate the level of impact under those categorizations.

Declines in lek attendance associated with oil and gas development may be a result of a suite of factors including avoidance (Holloran et al. 2005, Holloran et al. 2007, Aldridge and Boyce 2007, Walker et al. 2007, Doherty et al. 2008, WGFD 2009), loss and fragmentation of habitat (Connelly et al. 2000, Braun et al. 2002, Connelly et al. 2004, WGFD 2004a, Rowland et al. 2005, WGFD 2005, Naugle et al. in press), reductions in habitat quality (Braun et al. 2002, WGFD 2003, Connelly et al. 2004, Holloran et al. 2005) and changes in disease mechanisms (Naugle et al. 2004, WGFD 2004b, Walker et al. 2007, Cornish pers. comm.).

The BFO Resource Management Plan (BLM 2001) and the PRB FEIS Record of Decision (BLM 2003) included a two-mile timing limitation on surface-disturbing activities around sage-grouse leks. The two-mile measure originated with the Western Association of Fish and Wildlife Agencies (WAFWA) (BLM 2004). Wyoming BLM adopted the two-mile recommendation in 1990 (BLM 1990).

The two-mile recommendation was based on early research which indicated between 59% and 87% of sage-grouse nests were located within two miles of a lek (BLM 2004). These studies were conducted within vast contiguous stands of sagebrush, such as those that occur in Idaho's Snake River plain.

Additional research across more of the sage-grouse's range have since indicated that nesting may occur much farther than two miles from the breeding lek (BLM 2004). Holloran and Anderson (2005), in their Upper Green River Basin study area, reported that only 45% of their sage-grouse hens nested within 1.9 miles of the capture lek. Moynahan and Lindberg (2004) found that only 36% of their sage-grouse hens nested within 1.9 miles of the capture lek. Habitat conditions, and, thus, sage-grouse biology, within the BFO are more similar to Moynahan's north-central Montana study area than the Upper Green River area.

Moynahan's study area occurred in mixed-grass prairie and sagebrush steppe, dominated by Wyoming big sagebrush (Moynahan et al. 2007). Recent research in the Powder River Basin suggests that impacts to leks from energy development are discernable out to a minimum of four miles, and that some leks within this radius have been extirpated as a direct result of energy development (Walker et al. 2007, Walker 2008, Naugle et al. *In press*). Based on these studies, the BLM has determined that a two-mile timing limitation is insufficient to reverse the population decline.

A timing limitation does nothing to mitigate loss and fragmentation of habitat and changes in disease mechanisms. Rather than limiting mitigation to only timing restrictions, more effective mitigation strategies may include, at a minimum, burying power lines (Connelly et al. 2000b); minimizing road and well pad construction, vehicle traffic, and industrial noise (Lyon and Anderson 2003, Holloran 2005); and managing produced water to prevent the spread of mosquitoes with the potential to vector West Nile Virus in sage grouse habitat (Walker et al 2007). Walker et al. (2007) recommend maintaining extensive stands of sagebrush habitat over large areas (at least one mile in size) around leks to ensure sage-grouse persistence. The size of such a no-development buffer would depend on the amount of suitable habitat around the lek and the population impact deemed acceptable. Connelly et al. (2000) recommended locating all energy-related facilities at least two miles from active leks.

Several guidance documents are available that recommend practices that would reduce impacts of development on greater sage-grouse. These include *Northeast Wyoming Sage-Grouse Conservation Plan* (Northeast Wyoming Sage-grouse Working Group 2006), *Sage-Grouse Habitat Management Guidelines for Wyoming* (Bohne et al. 2007), *Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats* (WGFD 2009), *Bureau of Land Management National Sage-Grouse Habitat Conservation Strategy* (USDI 2004), and *Greater Sage-Grouse Comprehensive Conservation Strategy* (Stiver et al. 2006).

The PRB FEIS (BLM 2003) states that "the synergistic effect of several impacts would likely result in a downward trend for the sage-grouse population, and may contribute to the array of cumulative effects that may lead to its federal listing. Local populations may be extirpated in areas of concentrated development, but viability across the Project Area (Powder River Basin) or the entire range of the species is not likely to be compromised (pg. 4-270)." Based on the impacts described in the Powder River Basin Oil and Gas Project FEIS and the findings of more recent research, the proposed action may contribute to a decline in male attendance at the two leks that occur within four miles of the project area.

#### **4.4. Cultural Resources**

No historic properties will be impacted by the proposed project. Following the Wyoming State Protocol Section VI(A)(1) the Bureau of Land Management electronically notified the Wyoming State Historic Preservation Officer (SHPO) on 09/08/2010 that no historic properties exist within the APE. If any cultural values [sites, artifacts, human remains (Appendix L PRB FEIS)] are observed during operation of this lease/permit/right-of-way, they will be left intact and the Buffalo Field Manager notified. Further discovery procedures are explained in the Standard COA (General)(A)(1).

##### **4.4.1. Cumulative Effects**

Construction and development of oil and gas resources impacts cultural resources through ground disturbance, unauthorized collection, and visual intrusion of the setting of historic properties. This results in fewer archaeological resources available for study of past human life-ways, changes in human behavior through time, and interpreting the past to the public. Additionally, these impacts may compromise the aspects of integrity that make a historic property eligible for the National Register of Historic Places. Recording and archiving basic information about archaeological sites and the potential for subsurface cultural materials in the proposed project area serve to partially mitigate potential cumulative effects to cultural resources.

Fee actions constructed in support of federal actions can result in impacts to historic properties. Construction of large plans of coalbed natural gas development on split estate often include associated infrastructure that is not permitted through BLM. Project applicants may connect wells draining fee minerals, or previously constructed pipelines on fee surface with a federal plan of development. BLM has no authority over such development which can impact historic properties. BLM has the authority to modify or deny approval of federal undertakings on private surface, but that authority is limited to the extent of the federal approval. Historic properties on private surface belong to the surface owner and they are not obligated to preserve or protect them. The BLM may go to great lengths to protect a site on private surface from a federal undertaking, but the same site can be legally impacted by the landowner at any time. The cumulative effect of numerous federal approvals can result in impacts to historic properties. Archeological inventories reveal the location of sites and although the BLM goes to great lengths to protect site location data, information can potentially get into the wrong hands. BLM authorizations that result in new access can inadvertently lead to impacts to sites from increased visitation by the public.

**4.4.2. Mitigation Measures**

If any cultural values [sites, artifacts, human remains (Appendix L PRB FEIS)] are observed during operation of this lease/permit/right-of-way, they will be left intact and the Buffalo Field Manager notified. Further discovery procedures are explained in the Standard COA (General)(A)(1).

**4.4.3. Residual Effects**

During the construction phase, there will be numerous crews working across the project area using heavy construction equipment without the presence of archaeological monitors. Due to the extent of work and the surface disturbance caused by large vehicles, it is possible that unidentified cultural resources can be damaged by construction activities. The increased human presence associated with the construction phase can also lead to unauthorized collection of artifacts or vandalism of historic properties.

**4.5. Air Quality**

In the project area, air quality impacts would occur during construction (due to surface disturbance by earth-moving equipment, vehicle traffic fugitive dust, well testing, as well as drilling rig and vehicle engine exhaust) and production (including well production equipment, booster and pipeline compression engine exhaust). The amount of air pollutant emissions during construction would be controlled by watering disturbed soils, and by air pollutant emission limitations imposed by applicable air quality regulatory agencies. Air quality impacts modeled in the PRB FEIS concluded that projected oil & gas development would not violate any local, state, tribal or federal air quality standards.

**5. CONSULTATION/COORDINATION:**

Contact	Title	Organization	Present at Onsite?
Bob Anderson	Permit Agent	Heitzman Drill-Site Services	yes
Leroy Jones	Surface Owner		yes
Heather O'Brien	Biologist	WGFD	no

**6. OTHER PERMITS REQUIRED**

A number of other permits are required from Wyoming State and other Federal agencies. These permits are identified in Table A-1 in the PRB FEIS Record of Decision.

## 7. REFERENCES AND AUTHORITIES:

- Aldridge, C. L., and M. S. Boyce. 2007. Linking occurrence and fitness to persistence: a habitat-based approach for endangered greater sage-grouse. *Ecological Applications* 17:508-526.
- Doherty, K.E., D.E. Naugle, B.L. Walker, J.M. Graham. 2008. Greater sage-grouse winter habitat selection and energy development. *Journal of Wildlife Management*. In press.
- The National Environmental Policy Act of 1969 (NEPA), as amended (Pub. L. 91-90, 42 U.S.C. 4321 et seq.).
- Code of Federal Regulations (CFR)
- 40 CFR All Parts and Sections inclusive Protection of Environment Revised as of July 1, 2001.
  - 43 CFR All Parts and Sections inclusive - Public Lands: Interior. Revised as of October 1, 2000.
- Braun, C.E., O.O. Oedekoven, and C.L. Aldridge. 2002. Oil and Gas Development in Western north America: Effects on Sagebrush Steppe Avifauna with Particular Emphasis on Sage Grouse. In: *Transactions of the 67<sup>th</sup> North American Wildlife and Natural Resources Conference*. pp337-349.
- Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. Guidelines for management of sage grouse populations and habitats. *Wildlife Society Bulletin* 28:967-985.
- Connelly, J. W., S. T. Knick, M. A. Schroeder, and S. J. Stiver. 2004. Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats. Western Association of Fish and Wildlife Agencies. Unpublished Report. Cheyenne, Wyoming.
- U.S. Department of the Interior, Bureau of Land Management and Office of the Solicitor (editors). 2001. The Federal Land Policy and Management Act, as amended. Public Law 94-579.
- Approved Resource Management Plan for Public Lands Administered by the Bureau of Land Management Buffalo Field Office. Prepared by the United States Department of the Interior, Bureau of Land Management, Buffalo Field Office, April 2001.
- Powder River Oil and Gas Project Environmental Impact Statement and Resource Management Plan Amendment. Prepared by the Department of the Interior, Bureau of Land Management, Wyoming State Office in Campbell, Converse, Johnson and Sheridan Counties, Wyoming. Approved April 30, 2003.
- Holloran, M. J., R. C. Kaiser, and W. A. Hubert. 2007. Population Response of yearling greater sage-grouse to the infrastructure of natural gas fields in southwestern Wyoming. Completion report. Wyoming Cooperative Fish and Wildlife Research Unit, Laramie, WY, USA. 34pp.
- Holloran, M. J. 2005. Greater sage-grouse (*Centrocercus urophasianus*) population response to natural gas field development in western Wyoming. Dissertation, University of Wyoming, Laramie.
- Temple S. A. 1986. Predicting impacts of habitat fragmentation on forest birds: A comparison of two models. Pages 301-304 in *Wildlife 2000* (J. Verner, C. J. Ralph, and M. L. Morrison, Eds.). Univ. Wisconsin Press, Madison.

- Urban, D. L., and H. H. Shugart, Jr. 1984. Avian demography in mosaic landscapes: modeling paradigm and preliminary results. Pages 273-280 in J. Verner, M. L. Morrison, and C. J. Ralph editors. *Wildlife 2000: Modeling habitat relationships of terrestrial vertebrates*. University of Wisconsin Press, Madison.
- U.S. Department of the Interior, Bureau of Land Management and Office of the Solicitor (editors). 2001. *The Federal Land Policy and Management Act, as amended*. Public Law 94-579.
- U.S. Department of the Interior 2001, Bureau of Land Management, Buffalo Field Office. Approved Resource Management Plan for Public Lands Administered by the Bureau of Land Management Buffalo Field Office April 2001.
- U.S. Department of the Interior 2003, Bureau of Land Management. Powder River Oil and Gas Project Environmental Impact Statement and Resource Management Plan Amendment. April 30, 2003.
- U.S. Department of the Interior 2007, US Fish and Wildlife Service. *Reinitiation of Formal Consultation for Powder River Oil and Gas Project*. March 23, 2007
- U.S. Department of the Interior, Fish and Wildlife Service. 2002. Final Biological and Conference Opinion for the Powder River Oil and Gas Project, Campbell, Converse, Johnson, and Sheridan Counties (WY6633). U.S. Fish and Wildlife Service. December 17, 2002. Cheyenne, WY. 58pp.
- U.S. Department of the Interior, Fish and Wildlife Service (USFWS). 2010. *Endangered and Threatened Wildlife and Plants; 12-Month Findings for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered*. 50 CFR Part 17.
- Vander Haegen, W. M., F. C. Dobler, and D. J. Pierce. 2000. Shrubsteppe bird response to habitat and landscape variables in eastern Washington, USA. *Conservation Biology* 14:1145-1160.
- Walker, B. L., and D. E. Naugle. 2011. *West Nile virus ecology in sagebrush habitats and impacts on greater sage-grouse populations*. Pages 127-142 in *Greater sage-grouse: ecology and conservation of a landscape species and its habitats*, S. T. Knick, J. W. Connelly, C. E. Braun (eds). *Studies in Avian Biology*, Number 38, University of California Press, Berkeley.
- Walker, B. L., D. E. Naugle, K. E. Doherty, and T. E. Cornish. 2007. *West Nile virus and greater sage-grouse; estimating infection rate in a wild bird population*. *Avian Diseases* 51:691-696.
- Walker B, Naugle D, Rinkes T. 2003. The Response of Sage Grouse to Coal-bed Methane Development and West Nile virus in the Powder River Basin: Is There a Link ? Page 6 in: *Program and Abstracts for the Annual Wildlife Society Meeting, Wyoming Chapter*.
- Walker, B.L., D. E. Naugle, and K.E. Doherty. 2007. *Greater sage-grouse population response to energy development and habitat loss*. *Journal of Wildlife Management* 71:2644-2654.
- WGFD. 2009. *Minimum Recommendations for Development of Oil and Gas Resources within Crucial and Important Wildlife Habitats on BLM Lands*. WGFD. Cheyenne, WY.
- Zou, L., S. N. Miller, and E. T. Schmidtman. 2006. *Mosquito larval habitat mapping using remote sensing and GIS: implications of coalbed methane development and West Nile virus*. *Journal of Medical Entomology* 43:1034-1041.

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